1. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-5 + 4i \text{ and } 1$$

A. $b \in [7, 12], c \in [31, 38],$ and $d \in [-48, -38]$

B. $b \in [0, 5], c \in [-2, 10],$ and $d \in [-10, -2]$

C. $b \in [-10, -7], c \in [31, 38],$ and $d \in [35, 42]$

D. $b \in [0, 5], c \in [-7, 0],$ and $d \in [2, 5]$
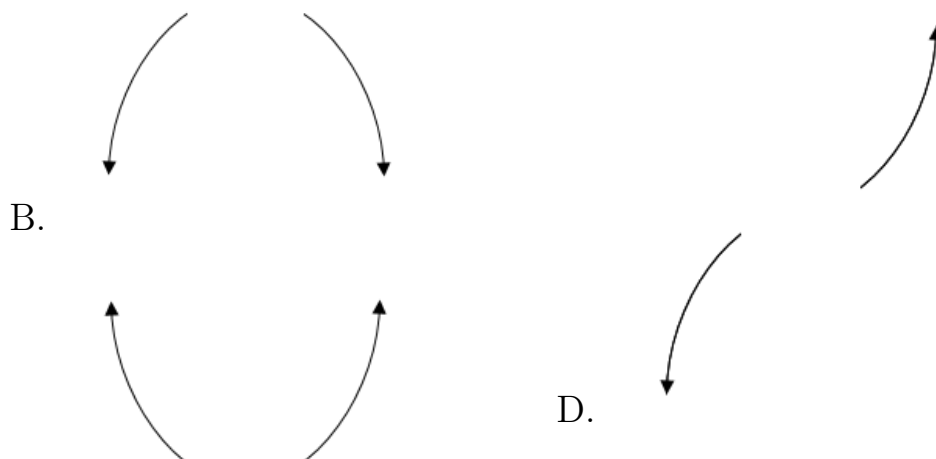
E. None of the above.

2. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-7}{3}, \frac{-3}{2}, \text{ and } -1$$

A. $a \in [0, 8], b \in [-18, -13], c \in [-7, -1],$ and $d \in [20, 27]$

B. $a \in [0, 8], b \in [-31, -26], c \in [43, 48],$ and $d \in [-21, -18]$

C. $a \in [0, 8], b \in [-2, 12], c \in [-29, -22],$ and $d \in [-21, -18]$

D. $a \in [0, 8], b \in [26, 34], c \in [43, 48],$ and $d \in [-21, -18]$

E. $a \in [0, 8], b \in [26, 34], c \in [43, 48],$ and $d \in [20, 27]$
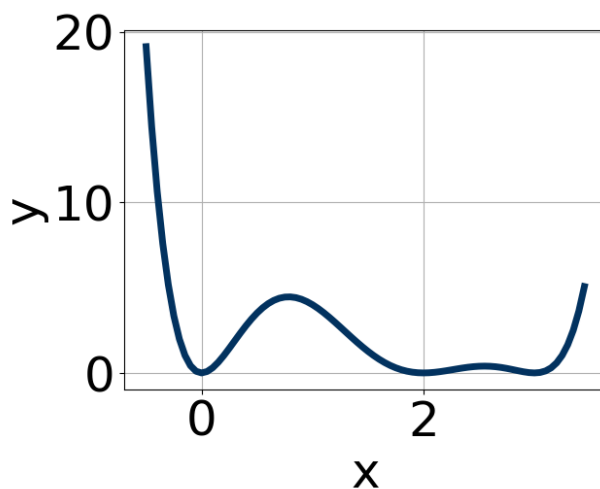
3. Describe the end behavior of the polynomial below.

$$f(x) = 8(x + 3)^5(x - 3)^{10}(x + 9)^2(x - 9)^3$$

B.

D.

C.

E. None of the above.

4. Which of the following equations *could* be of the graph presented below?

A. $-6x^{10}(x-3)^8(x-2)^{11}$

B. $-12x^8(x-3)^{10}(x-2)^{10}$

C. $20x^8(x-3)^4(x-2)^6$

D. $19x^{10}(x-3)^{10}(x-2)^5$

E. $17x^7(x-3)^8(x-2)^7$

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5. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-3}{4}, 4, \text{ and } \frac{4}{3}$$

A. $a \in [6, 19], b \in [54, 56], c \in [13, 20], \text{ and } d \in [-52, -44]$

B. $a \in [6, 19], b \in [-58, -53], c \in [13, 20], \text{ and } d \in [-52, -44]$

C. $a \in [6, 19], b \in [-58, -53], c \in [13, 20], \text{ and } d \in [47, 52]$

D. $a \in [6, 19], b \in [22, 29], c \in [-90, -84], \text{ and } d \in [47, 52]$

E. $a \in [6, 19], b \in [-77, -65], c \in [111, 121], \text{ and } d \in [-52, -44]$

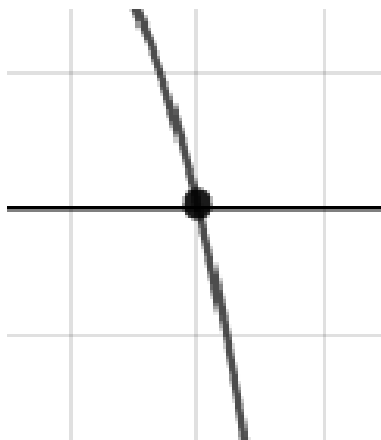6. Which of the following equations *could* be of the graph presented below?
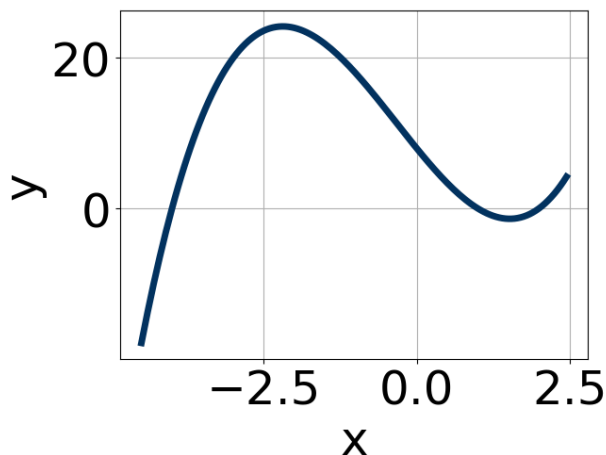
A. $-7(x - 1)^8(x - 2)^7(x + 4)^{11}$

B. $-17(x - 1)^5(x - 2)^9(x + 4)^9$

C. $11(x - 1)^7(x - 2)^9(x + 4)^7$

D. $20(x - 1)^{10}(x - 2)^8(x + 4)^{11}$

E. $18(x - 1)^6(x - 2)^{11}(x + 4)^5$

7. Describe the zero behavior of the zero $x = -4$ of the polynomial below.

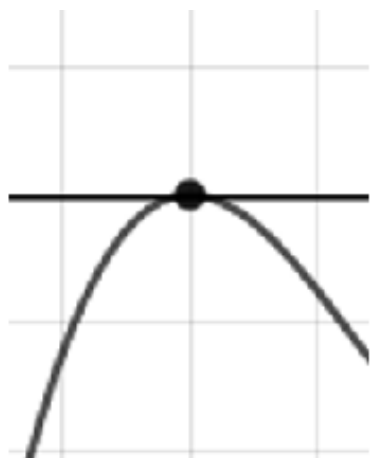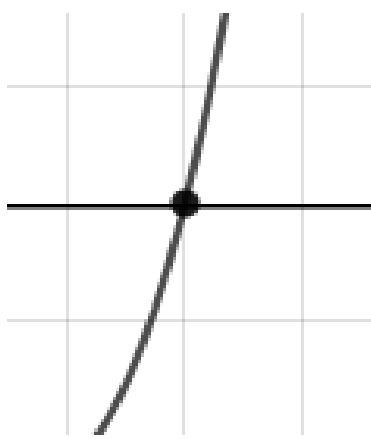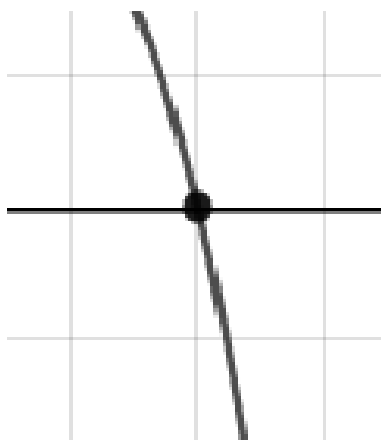$$f(x) = 4(x + 4)^8(x - 4)^{13}(x - 8)^2(x + 8)^6$$

A.

C.

B.

D.

E. None of the above.

8. Describe the zero behavior of the zero $x = -6$ of the polynomial below.

$$f(x) = -4(x-8)^{12}(x+8)^8(x+6)^{11}(x-6)^8$$

A.

B.
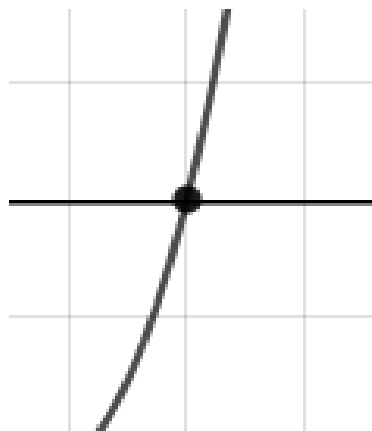
C.   D.

E. None of the above.

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9. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.
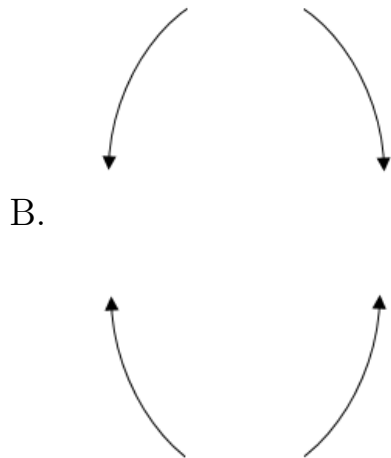
$$-5 + 4i \text{ and } 4$$

A. $b \in [-7.2, -3.1], c \in [-6, 9], \text{ and } d \in [157, 173]$

B. $b \in [-1.8, 4.3], c \in [-6, 9], \text{ and } d \in [-26, -16]$

C. $b \in [-1.8, 4.3], c \in [-10, -5], \text{ and } d \in [16, 23]$

D. $b \in [5.4, 7.5], c \in [-6, 9], \text{ and } d \in [-165, -163]$
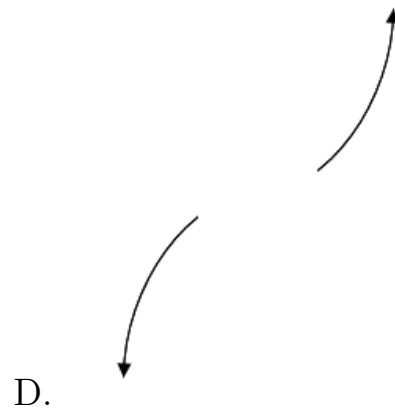
E. None of the above.

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10. Describe the end behavior of the polynomial below.

$$f(x) = 4(x - 9)^3(x + 9)^8(x - 8)^4(x + 8)^4$$

A.

B.

D.

C.

E. None of the above.